A·R·S SCIENCE HALL ·OF· FAME

June 6, 1989

Agricultural Research Service
United States Department of Agriculture

1986
Leonard F. Koppett

1987
Howard L. Bachrach
Myron S. Bragin
Glenn W. Dawson
Wilson A. Reeves
Forrest S. Sears
Orville A. Vogel
Cecil H. Wallgren

1988
Francis J. Clark
Edgar E. Hartwig
Ralph Howard Hodgson
Hamlin N. Munro
Jose Vicente Ramilo

The Agricultural Research Service Science Hall of Fame

The ARS Science Hall of Fame was inaugurated in 1986. We determined that each succeeding year, one or more present or former scientists with the Agricultural Research Service could be selected, subject to the following criteria:

- The selectee's research must have contributed significantly to the solution of a major agricultural problem and reflect credit on the Agricultural Research Service.

- The selectee is recognized nationally and internationally by his or her peers in the scientific community.

- The selectee's character and record of achievement is worthy of emulation by younger agricultural scientists.

- The selectee must be either retired or eligible to retire and must continue to be professionally active.

Today we honor several outstanding scientists by inducting them into the Science Hall of Fame. A plaque citing the achievements of each will be on permanent display in the new ARS National Visitor Center at the Beltsville Agricultural Research Center.

R. Dean Plowman
Administrator

June 6, 1989

Douglas R. Dewey
Research Leader (retired)
Forage and Range Research
Logan, Utah

For world leadership in genetics and taxonomy of the Triticeae tribe of grasses and for development of the cytogenetic basis for creating new grass hybrids.

Douglas R. Dewey assembled the world's largest and most diverse collection of the perennial species in the grass family subdivision called the Triticeae tribe. He is curator of this collection and maintains about two-thirds of the tribe's 250 perennial species at Logan, Utah.

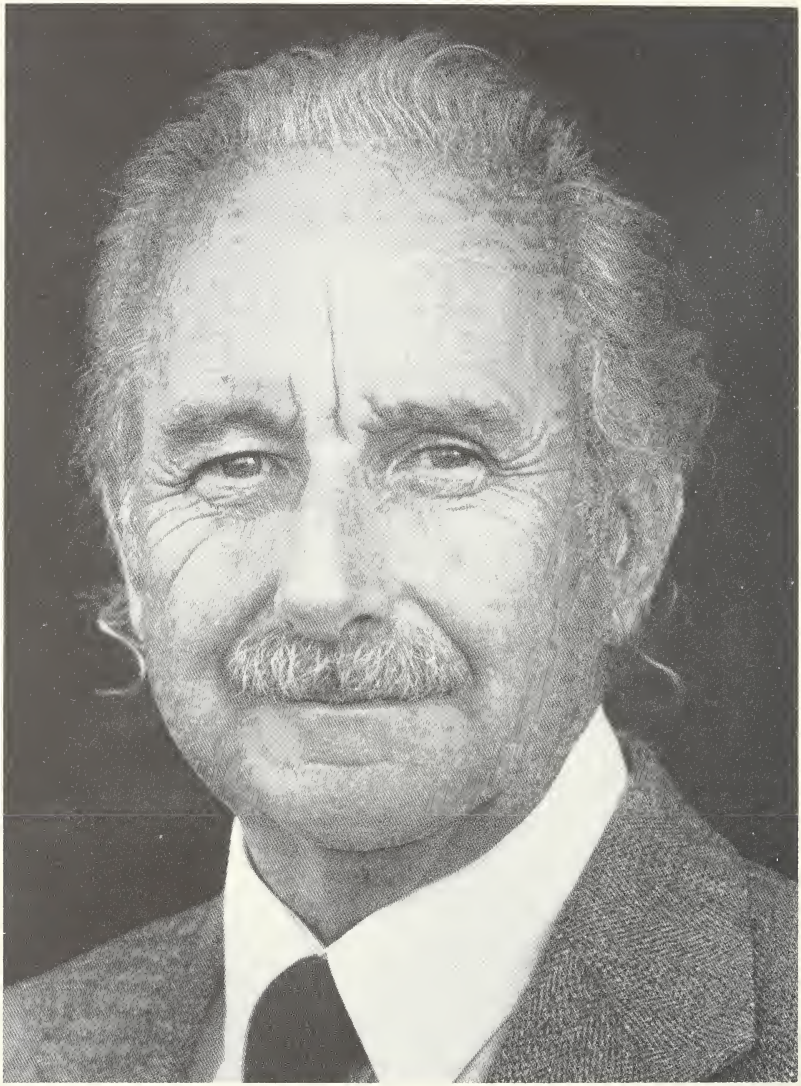
He determined the cytogenetic characteristics (such as chromosome number, type of polyploidy, genome constitution, and mode of reproduction) for most Triticeae species. This information has enabled breeders and geneticists to transfer genes among related grass species.

Dr. Dewey greatly expanded the available grass germplasm pool by creating, through genetic combinations, over 250 interspecific and intergeneric hybrids and 60 potentially new species. Several of the interspecific hybrids have provided the basis for promising new forage grasses.

His research has also facilitated genetic exchange between perennial Triticeae grasses and their cultivated relatives wheat, barley, and rye.

He demonstrated that crested wheatgrass is actually an autoploid series of diploid, tetraploid, and hexaploid forms whose genomes differ only by chromosomal restructuring. He developed procedures for transferring genes between different ploidy levels and demonstrated that all crested wheatgrasses should be considered as one large gene pool. One of the results of this research is the recently released cultivar Hycrest, which has consistently produced 25 to 50 percent more forage than any other commercially available crested wheatgrass cultivar. Hycrest's features mean that it has a potential value to U.S. ranchers of $20 million a year.

Dr. Dewey is a Fellow of the American Society of Agronomy and of the Crop Science Society of America. He retired from the Agricultural Research Service in 1984. He continues to curate the collection of Triticeae perennials and to carry on an active research program.



1989

Theodor O. Diener
Research Plant Pathologist (retired)
Microbiology and Plant Pathology Laboratory
Beltsville, Maryland

For conceptualizing and discovering viroids, for leading research on viroid detection and control, and for inspiring new approaches in the search for causes of several serious diseases affecting plants, livestock, and humans.

Theodor O. Diener is the discoverer of viroids, the smallest known agents of plant diseases.

Shortly after he came to work for ARS in 1959, he began to search for the pathogen that causes potato spindle tuber disease. This disease had been known for 50 years, but no one had isolated the causal agent. Dr. Diener purified the agent and showed it to be a small and unusually stable single-stranded RNA. He proposed the name "viroid" for this unexpectedly simple class of organisms because, like viruses, they multiply only inside living cells. Unlike conventional viruses, viroids have no protective protein coat; they are also 80 times smaller than known viruses and have only one-tenth as much genetic information.

Since 1971, when Dr. Diener first reported the potato spindle tuber viroid, viroids have been identified as the causes of more than a dozen other plant diseases. In collaboration with members of his research team and with scientists from other institutions, Dr. Diener has since further defined the unique properties of viroids.

His research has led to a practical diagnostic test for potato spindle tuber viroid based on recombinant DNA technology. The test has been patented, and it and variants for other viroids are used worldwide; it has also been adapted to the diagnosis of conventional plant viruses.

In 1978, Dr. Diener was elected a member of the National Academy of Sciences, and in 1987, he was awarded both the U.S. National Medal of Science and Israel's Wolf Prize in Agriculture in recognition of his landmark discovery and subsequent researches.

Dr. Diener retired from ARS in 1988 to accept a professorship in the Botany Department of the University of Maryland at its Center for Agricultural Biotechnology. He is leader of the university's Viroid Research team and of joint cooperative research on viroids being carried out by the university and ARS.

Karl H. Norris
Research Leader (retired)
Instrumentation Research Laboratory
Beltsville, Maryland

For developing principles and instruments using the electromagnetic wave spectrum to make rapid nondestructive measurements for evaluating quality of agricultural products.

Karl Norris developed near-infrared reflectance spectroscopy (NIRS) as a method for rapid measurement of the protein, oil, and moisture content of grain. The NIRS technology, which he developed in the late 1960's and 1970's, has been widely adopted in the world grain marketing system and is revolutionizing quality assessment in the industry. More than 1,500 NIRS instruments based on his original principles are being used for testing grain in the United States, Canada, and several European countries.

His concept of passing light through whole intact objects, such as apples, tomatoes, and potatoes, evolved from early research he carried out on candling eggs. His studies on light transmission led to his discovery that certain interior defects, such as internal browning in apples or hollow heart in potatoes, alter the transparency of the product to certain wavelengths of light.

He designed instruments to measure phototropic response of fungi to near-infrared radiation, to determine which spectra of radiation are most effective in control of diapause in insects such as oak silkworm pupae and codling moth larvae, and to measure the effect of certain biochemical changes on flower color.

He developed the instruments and techniques for the first spectrophotometric detection of phytochrome, the plant pigment that controls photoperiodic response. Detection of this pigment was a major contribution to the study of plant physiology.

In 1978, Mr. Norris received the Alexander von Humboldt award for his engineering accomplishments, and he was elected to the National Academy of Engineering in 1980. He retired from ARS in 1988. He remains active as a consultant.

John F. Sullivan
Chemical Engineer
Engineering Science Research
Philadelphia, Pennsylvania

For engineering contributions to the food-processing and preservation industries, including development of instant potato flakes and of batch and continuous explosion puffing.

John F. Sullivan was a senior member of the research team that developed the instant potato flake process. The team developed the "Philadelphia" cook, a pre-cooking step. Then he discovered that following this pre-cooking step with a cooling step retrogrades the starch, which is similar to tempering. This was the crucial discovery in development of the process for instant potato flakes. This process was the basis for all modern potato processing, including frozen French fries.

Development of instant potato flakes was integral to revitalization of the $2 billion potato industry. Instant potato flakes opened a new era in high-quality, low-weight, shelf-stable foods. About 400 million pounds of potato flakes worth $400 million are produced each year in the United States alone.

Mr. Sullivan was also instrumental in development of a batch explosion-puffing system that produces excellent dried, rehydratable fruit and vegetable products. Building on this technology, he then developed a continuous process for various fruits and vegetables.

The explosion-puffing process minimizes browning. The product's light weight reduces shipping costs. Conventional drying yields an adequate product and requires over 30 minutes to rehydrate it; explosion puffing yields an excellent product, which rehydrates in 5 minutes or less.

Mr. Sullivan retired from ARS in 1985. During his career, he received many awards, including the Institute of Food Technologists Industrial Achievement Award in 1959 and the Research and Development Association's Rohland A. Isker Award in 1981.

He continues to actively promote and extend explosion-puffing technology to an international audience. And he aids ongoing ARS research in computer simulation of food-processing.